



ସରକାରୀ ବହୁବଳ ବୈଷୟିକ ଅକ୍ଷୟାନ, କନ୍ଧମାଳ, ଫୁଲବାଣୀ

**GOVERNMENT POLYTECHNIC - KANDHAMAL, PHULBANI**

## Lesson Plan

Discipline: Civil, Electrical, Mechanical & Comp. SC		Semester: 2 <sup>nd</sup> Name of Faculty: Shree Abhaya Prasada Mohapatra
Subject: Applied Physics - II	No. of days per week Class allotted: 4	Semester From Date: 09-01-2026 To date: 08-05-2026
Week	Class Day	Theory
1st	1st	Introduction to the Subject, Syllabus and Course Outcomes
	2nd	<b>UNIT - 1: Wave motion and its applications</b> Wave motion, transverse and longitudinal waves with examples Definitions of wave velocity, frequency and wavelength and their relationship
	3rd	Sound and light waves and their properties, wave equation ( $y = r \sin t$ ) amplitude, phase, phase difference
	4th	Principle of superposition of waves and beat formation.
2nd	1st	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency
	2nd	Simple harmonic progressive wave and energy transfer
	3rd	Study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.
	4th	Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications,
3rd	1st	Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
	2nd	<b>UNIT - 2: Optics</b> Basic optical laws; Reflection and Refraction
	3rd	Refractive index, and image formation by mirrors
	4th	Images and image formation by lens and thin lenses
4th	1st	lens formula, power of lens
	2nd	magnification and defects
	3rd	Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber
	4th	Optical Instruments; simple microscope
5th	1st	compound microscope
	2nd	astronomical telescope in normal adjustment, magnifying power, resolving power, uses of microscope and telescope,
	3rd	optical projection systems.
	4th	<b>UNIT - 3: Electrostatics</b> Coulombs law, unit of charge, Electric field, Electric lines of force and their properties
	1st	Electric flux, Electric potential and potential difference

Week	Class Day	Theory
6th	2nd	Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor
	3rd	plane charged sheet and charged sphere.
	4th	Capacitor and its working, Types of capacitors, Capacitance and its units.
	1st	Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical),
7th	2nd	dielectric and its effect on capacitance, dielectric break down.
	3rd	<b>UNIT - 4: Current Electricity</b> Electric Current and its units, Direct and alternating current
	4th	Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances.
	1st	Factors affecting resistance of a wire, carbon resistance and colour coding
8th	2nd	Ohm's law and its verification, Kirchhoff's laws
	3rd	Wheatstone bridge and its applications (slide wire bridge only)
	4th	Concept of terminal potential difference and Electromotive force (EMF)
	1st	Heating effect of current, Electric power, Electric energy and its units (related numerical problems), Advantages of Electric Energy over other forms of energy
9th	2nd	<b>UNIT - 5: Electromagnetism</b> Types of magnetic materials; dia, para and ferromagnetic with their properties
	3rd	Magnetic field and its units, magnetic intensity, magnetic lines of force,
	4th	magnetic flux and units, magnetization
	1st	Concept of electromagnetic induction, Faraday's Laws
10th	2nd	Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor
	3rd	force on rectangular coil placed in magnetic field
	4th	Moving coil galvanometer; principle, construction and working
	1st	Conversion of a galvanometer into ammeter and voltmeter.
11th	2nd	<b>UNIT - 6: Semiconductor Physics</b> Energy bands in solids, Types of materials (insulator, semi-conductor, conductor)
	3rd	intrinsic and extrinsic semiconductors, p-n junction
	4th	Junction Diode and V-I characteristics, types of junction diodes
	1st	Diode as rectifier – half wave and full wave rectifier (center tapped).
12th	2nd	Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only).
	3rd	Photocells, Solar cells; working principle and engineering applications
	4th	<b>UNIT - 7: Modern Physics</b> Lasers: Energy levels, ionization and excitation potentials; spontaneous and stimulated emission
	1st	population inversion, pumping methods, optical feedback
13th	2nd	Types of lasers; Ruby Laser
	3rd	He-Ne Laser
	4th	semiconductor Laser
	1st	Laser characteristics, engineering and medical applications of lasers.
14th	2nd	Fiber Optics: Introduction to optical fibers

Week	Class Day	Theory
	3rd	light propagation, acceptance angle and numerical aperture
15th	4th	fiber types, applications in; telecommunication, medical and sensors
	1st	Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials
	2nd	properties at nanoscale, nanotechnology, nanotechnology-based devices and applications.
	3rd	Revision
	4th	Revision

BOOK REFERENCE:

- 1 Applied Physics-II by Prof. Hussain Jeevakhan
- 2 Text Book of Physics for Class XII (Part-I, Part-II); N.C.E.R.T., Delhi
- 3 Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

Concerned faculty: S. I. 26  
Sri Abhaya Prasada Mohapatra

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